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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/803,502

03/17/2004

Brian Kevin Paul

245-68071-01

5691

24197 7590 03/30/2009
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EXAMINER

D'ANIELLO, NICHOLAS P

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

03/30/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/803,502	Applicant(s) PAUL ET AL.	
	Examiner Nicholas P. D'Aniello	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6,7,9-27,37 and 43-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6,7,9-27,37 and 43-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/17/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The Declaration of Professor Brain Kevin Paul under 37 CFR 1.131 is sufficient to overcome the Paul I and II references used in the prior action. The declaration has sufficiently established that the "Intermetallic Microlaminations for High-temperature Microreactors" paper and content contained therein does not qualify as prior art in this application. The examiner appreciates the clarity in the response to the requirement for information.
2. The amendments to the claims have overcome the double patenting rejection previously applied.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 9-13, 15-20, 23-26, 37 and 43-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Norris et al. (USP 4,869,421).

Regarding the **independent claim 1**, Norris et al. teach a method for making a structure, at least a portion of which is intermetallic, the method comprising: patterning at least one patternable intermetallic lamina (honeycomb core 12) to form a patterned

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intermetallic lamina, the patternable intermetallic lamina comprising titanium aluminide (as seen in figure 1 this core is patterned into a honeycomb formation, i.e. changed geometrically conforming to applicant's definition of patterned on page 16 lines 12-13 of instant specification); adding at least one bonding material (interlayer 14) to the registered stack to facilitate bonding between the intermetallic lamina and a second lamina (face sheet 16) adjacent the intermetallic lamina; stacking and registering the patterned intermetallic lamina with at least one non-patterned lamina (face sheet 16) other than the bonding lamina, thereby forming a registered stack; and processing the registered stack to make an intermetallic structure (column 2, line 49 - column 3 line 52).

In regard to **claims 9 and 10**, the titanium aluminide is 20-80 atomic percent titanium and the remainder aluminum (column 2 lines 56-58) this includes TiAl and Ti₃Al.

In regard to **claim 11**, the bonding material (interlayer 14) is positioned between the first intermetallic lamina (core 12) and a second intermetallic lamina (face sheet 16) (figure 1, column 3 lines 30-39).

In regard to **claim 12**, the bonding material (interlayer 14) may be multilayer form with one or more thin layers of each constituent metal, such as a layer of pure nickel (column 3 lines 4-18).

In regard to **claim 13**, the bonding layer may be as thick as 0.0003 inches (column 3 line 26) or 7.62 microns.

In regard to **claim 15**, the method comprising procuring a lamina blank (face sheet 16).

In regard to **claims 16-20**, a second lamina is provided (interlayer 14, note that there are two provided in figure 1) which may be multilayer form with one or more thin layers of each constituent metal, such as a layer of pure nickel and pure copper (i.e. different elements, column 3 lines 4-18). As there is two interlayers 14 provided and each has multiple layers this encompasses a bonding layer and three additional metal layers.

In regard to **claim 23**, the second interlayer 14 may powder, plasma or vapor deposited and is considered an adhesive between core 12 and face sheet 16 (column 3 lines 19-28).

In regard to **claims 24-26**, the assembly is heated in a vacuum at sufficient time and temperature to cause an intermetallic to form by liquid-phase diffusion bonding (column 3 lines 53-68)

In regard to **claim 37**, as seen in figure 2, at least two adjacent lamina 16 are connected by a post 12.

In regard to **claims 43-45**, as noted above the laminas include nickel foil 14, aluminum, titanium and intermetallics foils (face sheets 16 are intermetallic foils) thereof.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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6. Claims 3, 4, 6, 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris et al. in view of Deevi et al. (US Pub 2002/0085941).

Norris et al. teach the method as applied to the claim 1 above. **Claims 3, 4, 6 and 7** differ from the reference in calling for the intermetallic to be specific iron aluminide or iron aluminide, where the reference only discloses titanium aluminide.

However, Deevi et al. teach the processing of aluminides and the ability to interchangeability use iron, titanium and iron aluminides for honeycomb structures because they can be formed into desired dimensions and with desired properties (paragraph [0052]) nickel aluminides including NiAl and Ni₃Al, and the iron aluminides including FeAl and Fe₃Al (abstract, paragraphs [0026-27]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the structures of Norris et al. from any suitable intermetallic such as iron aluminide or nickel aluminide because such is an art recognized alternative to titanium aluminides as taught by Deevi et al.

In regard to **claim 14**, while Norris et al. is open to any manufacturing process for patterning the honeycomb core (column 2 lines 49-50) the reference does not specifically disclose any particular process. However, Deevi et al. teaches that laser cutting and mechanical stamping are common techniques for patterning intermetallic sheets (paragraph [0052]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to pattern the lamina of Norris et al. by a process such as mechanical stamping (a hydraulic process) or laser cutting (plasma cutting) because these

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techniques are known to pattern intermetallic strips into their desired dimensions as taught by Deevi et al.

7. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris et al. in view of Johnson (USP 3,444,925).

Norris et al. teaches the method according to claim 1 where a layer of nickel is provided (as applied to claim 12) or where one the layer may be pure titanium (see column 4, Example II). **Claims 21 and 22** differs from the reference in calling for two layers of aluminum. However, Johnson teach a method of making similar honeycomb structural members (see figures) and that it is preferable to inert the machined structures between two sheets of aluminum foil during corrugation to distribute stresses (column 6 lines 60-70) in the forming of honeycomb structures of out materials such as intermetallics (column 12 lines 15-57).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use two sheets of aluminum in the structure making method of Norris et al. to distribute stresses during corrugation as taught by Johnson.

8. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris et al. in view of Betta et al. (USP 5,512,250).

Norris et al. teaches the method according to claim 1, **claim 27** differs from the reference in calling for a catalyst associated with the intermetallic structure. However, Betta et al. teaches that intermetallic honeycomb structures are good supports for

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catalyst systems because of their resistance to heat and chemical inertness and that by incorporating a catalyst into an open structured honeycomb such as nickel and titanium aluminide structure one can form an effective catalytic converter for exhaust gasses (see at least column 11 lines 26-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a catalyst into the intermetallic structure of Norris et al. in order to form an exhaust gas purifying catalytic converter as taught by Betta et al., as appreciated by Betta et al. the structure would then need to be formed into an open structure.

Response to Arguments

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection. As applied above the claim language does not distinguish from a method of making an intermetallic honeycomb structure as the claimed patterning reads on corrugating a honeycomb sheet.

Inquiries

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas P. D'Aniello whose telephone number is (571)270-3635. The examiner can normally be reached on Monday through Thursday from 8am to 5pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. P. D./
Examiner, Art Unit 1793

/Kiley Stoner/
Primary Examiner, Art Unit 1793